during the winter months of 2086 pounds per square foot. During a heavy gale this pressure is increased to 6983 pounds; yet the thin oil blanket is sufficient, when applied under certain conditions, to enable a vessel to navigate through them in perfect safety, their oiled summits raising themselves in sullen grandeur, but never breaking aboard. What the exact coefficient of friction between air in motion and water is, and the proportion of its reduction by oil or other lubricants, are questions that open up a most interesting subject of inquiry, the resolution of which will prove highly beneficial to the whole nautical and mercantile world.

Numerous experiments have been made with a view to testing the utility of oil in smoothing the approaches to exposed harbours in rough weather. The tests undertaken at Peterhead have met with unqualified success. The *modus operandi* has been to lay leaden pipes along the bottom of the harbour, taking care to keep the pipes stationary by means of concrete. The pipe is provided with numerous roses for disseminating the oil. When rough weather comes on, oil is forced along the pipes, and it escapes into the water through the apertures provided, and then, its specific gravity being less than that of water, it rises to the surface and quickly renders the sea less turbulent and the passage into the harbour quite safe. Another method employed to render safe ingress into harbours in bad weather is that of firing out to sea an oil-carrying projectile. This consists of a heavy tin tube weighted with lead at one end. The tube is filled with two or three quarts of oil, and the aperture stopped. When the projectile is fired from a gun or mortar, it reverses, and, the time-fuse exploding, the powder blows out the plug, and the liberated oil falls into the sea. A series of experiments, conducted by a Committee appointed by the United States Life-saving Service to inquire into the practical utility of oil-carrying projectiles, goes to confirm the statement made above, viz. that the power of oil to subdue the force of the waves in shoal water, or to prevent the waves breaking in surf, is very small indeed. There is one point, however, upon which all authorities who have tested the use of oil at sea are agreed. As an adjunct to the equipment of ships' boats it is simply invaluable. Many a shipwrecked crew have been enabled to keep their frail craft afloat until land was reached or a rescue effected, solely by its use. Nothing is more common among the records of shipwrecks than to read of the small boats either being swamped while at the vessel's side, or capsizing through stress of weather. In January 1884 the *Cambria* emigrant ship was run into by the *Sultan* in the North Sea, and, out of 522 on board, 416 were drowned. Of the four starboard boats, no less than three capsized, and all their occupants perished. In the collision in the Channel between the *Forest* and *Avalanche*, two out of three boats which left the *Forest* were swamped, and all on board lost their lives. These are but two instances out of many where lives *might* have been saved by the use of a little oil.

The subject of saving endangered life at sea is one that always enlists the deepest sympathies of all sorts and conditions of men. The perusal of the "Annual Wreck Chart," published by the Board of Trade, or of the lamentable records of personal sorrows and destitution consequent upon the disasters around our coasts, suggests the possibility that the loss of life might be considerably reduced by a practical knowledge of the best methods of applying oil during storms at sea. We think that much might be done by its use to facilitate the launching of boats from distressed vessels, and their safe subsequent navigation. Harbours of refuge on exposed coasts might be established at a very small cost.

In one department alone of our maritime industry, deep-sea fishing, many lives might be saved. At present, the mortality among the carriers, *i.e.* those engaged in carrying in small boats the fish from the smacks to the steam despatch-boats, is very great. Their boats might be equipped, at a very low cost, with oil-tanks or oil-bags to be used when trans-shipments are being effected in heavy weather. Already the Governments of the United States and Germany have realized the vast importance of this subject, and have instituted an exhaustive series of experiments with the view of rendering compulsory the carrying of oil for use as a life-saving equipment. When that complex and overburdened instrument of government, the Board of Trade, was asked in Parliament to cause experiments to be made relative to the use of oil at sea, the reply was, that there were no funds available for the purpose; that the Board could not spend money or become investors in such schemes. The Consultative Committee appointed under the Life-saving Appliances Act of last year have, however, suggested oil-bags, among other equipments, to be carried by boats and rafts. At the International Maritime Conference at Washington, U.S., this subject has received the attention its importance merits. Further, the National Life-boat Institution and the National Sea Fisheries Protection Association have amalgamated their forces with a view to testing the efficacy of oil, but as yet the results of their investigations have not been published. While it is very gratifying to know that the man of science and the philanthropist are ready to explore the practical utility of this question, we cannot hope for any satisfying material results until the Board of Trade sees its way to take administrative action in the matter, and to deal in a fitting manner with a question that is so indissolubly connected with the interests of all classes of this great mercantile community.

RICHARD BEYNON.

RECENT OBSERVATIONS OF JUPITER.

OBSERVATIONS of Jupiter have been conducted under great difficulties during the past opposition in consequence of the low altitude of the planet. His elevation, even at meridian passage, has only been about 16°, as observed in this country, so that the study of his surface markings has been much interrupted by the bad definition which usually affects objects not far removed from the haze and vapours on the horizon. It is, however, important that planetary features, especially those which exhibit changes of form and motion, should be watched as persistently as circumstances allow, and with this purpose in view Jupiter has been submitted to telescopic scrutiny whenever the atmosphere offered facilities for such work during the past summer and autumn. Few opportunities occurred, however, during the latter season owing to the great prevalence of clouds, and on the several nights sufficiently clear for the purpose, the atmosphere was unsteady and the definition indifferent; thus the more delicate lineaments of the planet's surface could be rarely observed with satisfactory distinctness.

The great red spot was visible on the night of May 21, 1889, and it was estimated to be on the central meridian at 12h. 31m. Further views of the same object were secured in June, July, and later months. In appearance and form it presented much the same aspect as in preceding years. Its elliptical outline is still preserved, and there seems to have occurred no perceptible change in its size. It is somewhat faint relatively to the very conspicuous belts north of it, and it is only on a good night that it can be well recognized as a complete ellipse with a dusky interior. On the evening of September 12 last, I obtained an excellent view of it with my 10-inch reflector, power 252. The spot was central at 6h. 33m., and its following end was seen to be much the darkest. This has usually been the case, and I have often noticed a very small, black spot at this extremity. Another observation was effected on the early evening of November 26, when the spot crossed the planet's centre at 3h. 54m., but the

© 1889 Nature Publishing Group

exact time was a little uncertain, the conditions being far from favourable. Possibly the spot may have effected its passage a little before this time, as from several views of the following end of this object at about 4h. 30m., I concluded my estimate might be a trifle late, but in any case the error would be small.

Comparing the observation on November 26 with that recorded on May 21, it will be found that in the interval of 188·64 days the red spot completed 456 rotations, and that its mean period was 9h. 55m. 40·15s. This is nearly identical with the rotation period I found for the same object in 1888, when it was 9h. 55m. 40·24s. (462 rotations), and in 1887, when the figures were 9h. 55m. 40·5s. It is evident from these several determinations that during the last three oppositions the motion of the spot has been very consistent and equable. There has been a slight acceleration perhaps in velocity, inducing the rotation period to become a little shorter, but the differences are so small that they may well be covered by the observational errors which cannot be altogether eliminated from work of this character, and particularly at a time when the object observed is unfavourably placed. In any case the red spot has rotated with more celerity during the last year or two than in 1886, when its mean period was 9h. 55m. 41·1s., to which it had gradually increased from 9h. 55m. 34·2s. in 1879-80. These variations of motion may be regularly effected in a cycle, and it will be very important if future observations can determine the exact period.

The white spots near the equator of Jupiter are still occasionally visible, but it has not been feasible to secure views of them of a sufficiently exact nature to deduce their rotations. In recent years the apparent velocity of these objects has been decreasing, for while in the autumn of 1880 their period was 9h. 50m. 6s., it was found, from many observations of similar markings by Mr. A. Stanley Williams, of Brighton, in 1887, that it had increased to 9h. 50m. 22·4s.

Since 1884 a number of white spots have been also observed on the northern borders of the great northern equatorial belt. The period of these is but very slightly less than that of the red spot. On September 12, I observed one of these situated in a longitude not far preceding the west end of the red spot, and it appeared to have divided the equatorial belt with a vein of bright material. There was another object of the same kind following the red spot, but in this case the continuity of the belt was not interrupted, the bright matter appearing as a slight indentation in its northern side. These markings are shown in a drawing of Jupiter made by Mr. Keder with the great Lick refractor, power 315, on September 5 last, but they are not delineated in quite the same characters as seen here. The drawing alluded to is perhaps the best and the most replete with detail of any I have ever seen of this planet, and it furnishes clear testimony that the defining properties of the 36-inch telescope are of the highest order.

The curiously curved belt immediately north of the red spot is still one of the most prominent features on the planet's disk. It forms the southern half of the great south equatorial belt which is double. Under the ends of the red spot it suddenly dips to the north and runs into the other half of the belt. In recent years the curved belt has been very dark and pronounced in the region contiguous to the following end of the red spot, and upon its crest there have been condensations of extremely dark matter. Under the preceding end of the spot this belt is, however, more delicate in tone, and it looks like a mere pencil shading.

During the few ensuing years these interesting features may be studied to greater effect, as the planet will assume a more northerly position, and rise above the vaporous undulations which have recently much interfered with observations of his surface. W. F. DENNING.

NOTES.

DR. ARCHIBALD GEIKIE, F.R.S., has just received a diploma of membership of the Kaiserlich Leopoldinisch-Carolinisch Deutsche Akademie der Naturforscher, the oldest scientific Society of Germany.

SIR JOHN LUBBOCK'S name appears in the list of those who have received New Year's honours and appointments. He has been made a member of the Privy Council. A baronetcy has been conferred on William Scovell Savory, F.R.S., President of the Royal College of Surgeons.

THE Paris municipality proposes to do honour to the memory of Darwin by naming a new street after him.

A COMMITTEE has been formed in Paris for the purpose of preparing the way for the erection of a statue of the late M. Boussingault. His scientific researches were of so much service to industry, especially to agriculture, that the Committee ought to have little difficulty in obtaining the necessary funds.

THE death of Sir Henry Yule, which we regret to have to record, is a great loss to geographical science. He died on Monday, in his seventieth year. His masterpiece was his splendid edition of the "Book of Ser Marco Polo"—a work to the permanent value of which he added largely by his learned and luminous notes.

WE regret to announce the death, after an illness which lasted some months, of M. Eugène Deslongchamps, of the Château Mathieu, Calvados. He was formerly Professor of Zoology and Palæontology at the Faculty of Sciences at Caen, and a member of the committee of the "Palæontologie Française." He was the son of the celebrated French palæontologist, Prof. Eudes-Deslongchamps, and published several memoirs on the palæontological fauna of Normandy, ranging from Brachiopoda to the Crocodilia. His best known memoirs are the "Prodrome des Teléosauriens du Cavaldos" and "Les Brachiopodes des Terrains Jurassiques."

GERMAN papers announce the death of Dr. Karl Edward Venus, an eminent entomologist, and founder of the Entomological Society "Iris," at Dresden. He died on December 13.

THE Congress of Russian men of science and physicians is now holding its eighth meeting. Work began on December 28, and will go on until January 7.

THE general meeting of the Association for the Improvement of Geometrical Teaching will be held in the Botanical Theatre, University College, London, on Friday, January 17. At the morning sitting (11 a.m.) the reports of the Council and the Committees will be read, the new officers will be elected, and various candidates will be proposed for election as members of the Association. After an adjournment for luncheon at 1 p.m., members will reassemble for the afternoon sitting (2 p.m.), at which papers will be read by the Rev. Dr. C. Taylor, on "A New Treatment of the Hyperbola"; by Mr. G. Heppel, on "The Teaching of Trigonometry;" by Mr. E. M. Langley, on "Some Geometrical Theorems"; and by the President (Prof. Minchin), on "Statics and Geometry."

THE Annual Conference of the Principals of the University Colleges was held on Tuesday at the Durham College of Science, Newcastle-upon-Tyne, Principal Garnett occupying the chair. The Principals were subsequently entertained at dinner by the chairman. Several questions affecting the interests of the Colleges collectively were discussed at the meeting, and it was decided on the invitation of Principal Reichel that the next gathering should be held at University College, Bangor.

THE Paris Municipal Council has lately instituted two new scientific chairs in the Hotel de Ville. One of them is devoted

© 1889 Nature Publishing Group